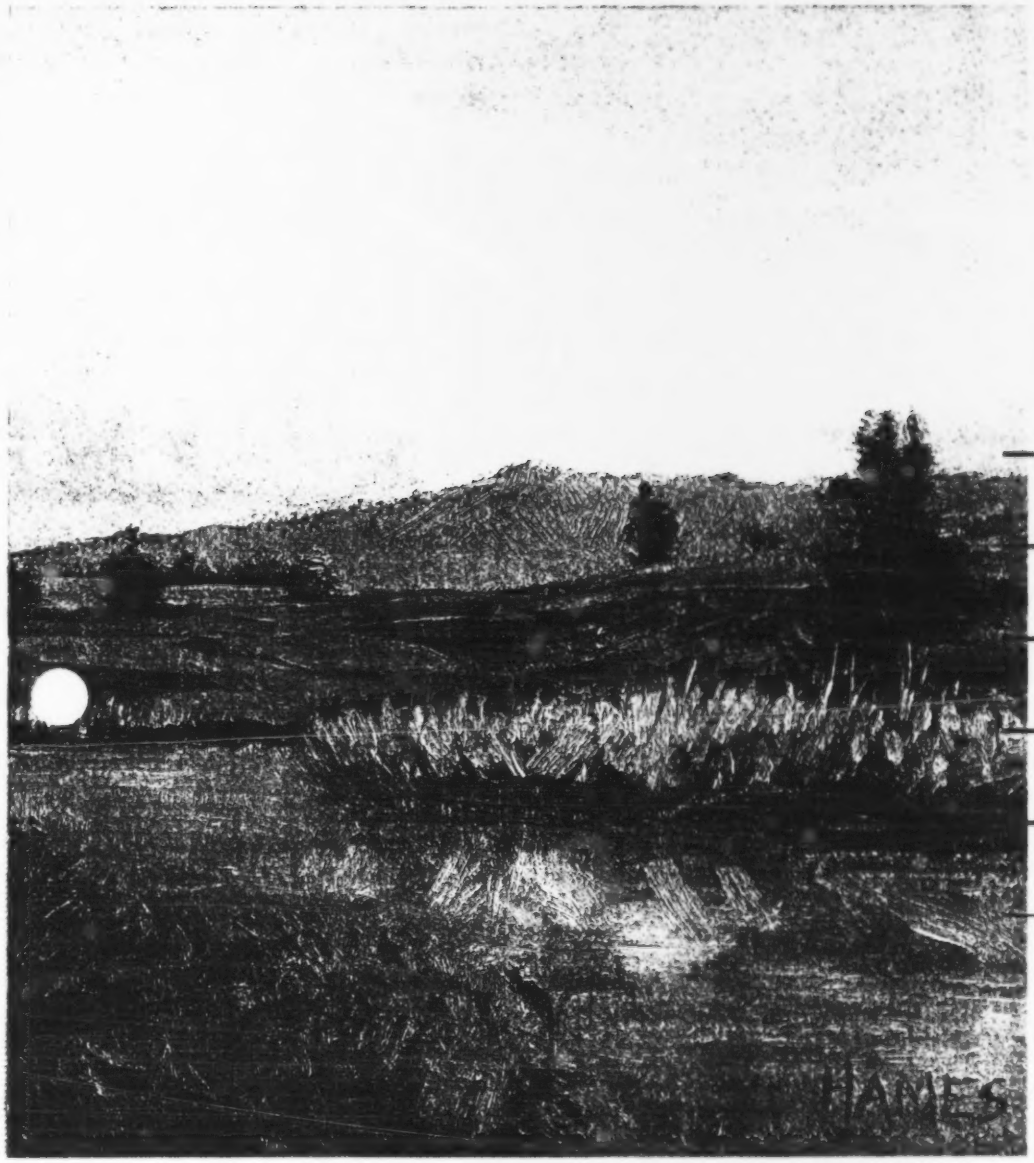
ECOSYSTEMS IN BRITISH COLUMBIA



Wetlands of the Southern Interior Valleys

Wetland areas provide wildlife and biodiversity values disproportionate to the area they occupy.

BRITISH COLUMBIA
Ministry of Sustainable Resource Management
Ministry of Water, Land and Air Protection

104-07342/

Why are wetlands of the southern interior valleys at risk?

Wetlands are hotspots of biodiversity in British Columbia. They are particularly important in the ponderosa pine forests and the grasslands of the southern interior, one of the hottest, most arid regions in Canada. Wetlands act as oases in a parched land, providing a wide variety of species with the necessities of life. Numerous plant and wildlife species, from orchids to waterlilies, and from damselflies to large mammals, depend on wetlands for food, shelter, water, and breeding sites. In this arid region, wetlands act as wildlife magnets. Like watering holes on the Serengeti, they draw wildlife in from all directions.

Wetlands have always been uncommon in the hot, dry climates of the interior. In the arid environment of the bunchgrass and ponderosa pine regions, they occupy only 0.3 to 0.7 percent of the land area. The number of healthy wetlands in these regions has been reduced by modern land-use pressures. As the wetlands have disappeared, so also have many of the plants and birds, the dragonflies, and the frogs once heard on summer evenings.

The main threats to these wetlands vary somewhat depending on their location. Direct loss due to urban and rural development is the most immediate danger facing the wetlands of British Columbia's hot, dry valleys. With their gentle slopes and arid climate, these valleys have become a popular place to live. For example, it is estimated that the population of the Central Okanagan Regional District will grow by 62 percent between the years 2000 and 2026. This scale of growth will put increasing pressure on the remaining wetlands in the region. In the area between Penticton and Osoyoos alone, 85 to 90 percent of the large marshes have disappeared. In some regions, intensive recreational use is the main threat. Heavy recreational use of shoreline areas, particularly where wetlands are found along the edges of lakes, can reduce plant cover, compact the soil, and disturb nesting birds and other wetland species.

All of the arid valleys of British Columbia, including those in the Cariboo-Chilcotin, Kootenay and Okanagan regions, are conducive to agriculture. Large tracts of land have been converted to agricultural uses such as croplands, vineyards and orchards, or used as rangelands. Many wetlands have been drained and filled in the process. The filling in of these "watering holes" has now left many areas empty of any natural source of water for wildlife.

Like watering holes on the Serengeti, wetlands draw wildlife from all directions.

Because of their adaptability to seasonal and annual variation in water levels, wetlands can withstand minor changes in water level and water quality. However, draining or significantly reducing the amount of water that comes into a wetland will reduce or eliminate its biodiversity and its value as wildlife habitat. Even efforts to stabilize the water table may eliminate an existing wetland or affect its habitat potential, particularly if it results in raising the original water level.

In order to supply water to agricultural fields, watercourses have been diverted, channelled, and depleted, affecting wetland ecosystems, even some that occur further downstream. Because the flow of water (and nutrients) into and out of wetlands controls their character and integrity, activity in and around wetlands that affects water flow can have serious negative effects.

Since wetlands often occur in slight depressions in the landscape, runoff from agricultural fields that includes herbicides, insecticides and fertilizers can collect in these depressions, poisoning some of their inhabitants. In addition, wetlands are underlain by thick, loose soil parent materials, which influence the loss of water from the wetland through subsurface flow. Many wetlands in agricultural areas have experienced this "draw-down" in which the unsustainable use of natural water sources for irrigation has caused nearby wetlands to dry up completely.

Unsustainable range practices also take a toll on wetlands. Cattle overuse can damage plants, alter the soil surface, and change the shape and stability of stream banks. Cattle may disturb nesting birds and other wildlife, and the trampling can turn once vegetated areas into bare, muddy patches. Livestock feces can pollute as well as alter the natural nutrient flux of a wetland, resulting in changes in plant and animal species which can survive there. Alien plant species can be carried by people, on the hair and hooves of livestock, or on working vehicles, and these introduced species can spread to wetlands and displace native plants. One example is the beautiful but aggressive purple loosestrife, which, if left untended, can quickly out-compete all native species. Some alien species, such as summer-cypress, Kentucky bluegrass and various species of dock take over along the margins of wetlands or lake-shores. Alien animal species such as non- native fish can also adversely affect wetland biodiversity.

What are wetlands?

The wetlands in British Columbia's arid valleys are pools of biodiversity in a swath of hot grasslands and dry, open forests. They include marshes

alive with the calls of ducks and frogs and the buzz of dragonflies, alkaline ponds in potholes and meadows, and shrub swamps boisterous with the rattles, whistles and squawks of the Yellow-breasted Chat.

Wetlands, by definition, occur on sites where the water table is at, near, or above the soil surface and where soils are saturated with water for all or part of the year. Because the water reduces the level of oxygen in the soil, only certain plants can grow there and the plant communities are strikingly different from those in the surrounding landscape. Take one step away from the grassland and into the wetland and the array of plant species changes completely. Every plant you see is different from those in the grassland you left behind.

Marshes are permanently or seasonally inundated wetlands, and there is often standing water in parts of the marsh for a significant part of the growing season. Cattails and bulrushes are the dominant vegetation. Many marshes have a mosaic of habitats, with pools and channels of shallow, open water. Much of the vegetation is rooted in mineral soil or organic "muck" sediment, and emerges above the water's surface. Due to their mosaic nature, marshes are usually extremely high in the diversity of wildlife species using them.

Within arid and semi-arid valleys the total area covered by wetlands is estimated at only 0.5 percent.

Alkaline ponds and wet meadows usually occur in shallow depressions in the grassland landscape, often adjacent to marshes. Changes in seasonal precipitation create a repeated cycle of flooding and drying of these sites. This cyclical process of evaporation draws mineral salts to the soil surface, eventually leaving a salt crust through which vegetation must grow. Only specialized plants can grow under these conditions. Alkali saltgrass can tolerate high salinity, and it dominates the most alkaline and saline sloughs. Nuttall's alkaligrass, foxtail barley, and field sedge are other species that have adapted to the saline and alkaline environments of the dry interior.

Areas of shallow, open water, with little or no emergent vegetation, also occur in the grassland landscape. Floating aquatic species such as yellow waterlily, or aquatic plants that grow only below the water's surface are the main types of vegetation here. The latter include the native whorled water-milfoil, or greater bladderwort, whose leaves are below the surface but whose flower stems look like small yellow periscopes poking out of the water. Shrub swamps are less common and tend to occur at the fringes of lakes and margins of rivers rather than as isolated pockets.

Why are wetlands important?

Wetlands provide wildlife and biodiversity values that are disproportionate to the small area they occupy on the land base. They provide food, shelter, and breeding habitat for numerous amphibian, reptile, mammal, bird, and insect species. The American Bittern, Black-necked Stilt, Forster's Tern, Yellow-headed Blackbird, and Western Grebe, for example, all depend on wetlands in our dry valleys as summer feeding sites. Many species, such as Tiger Salamanders, require the combination of wetland immediately adjacent to uplands to fulfill all their habitat needs. Many other migrating bird species depend on these ecosystems as stopovers to rest and feed.

Wetlands are of great consequence on their own, and they also play an integral part in a larger ecosystem, the grasslands of British Columbia, whose

importance is gaining national recognition. Because grasslands cover an extremely small area of British Columbia (0.3 percent), these wetlands are particularly vulnerable. The ponds and marshes where scant rainfall in these areas collects, or where the groundwater reaches the surface, are essential for maintaining the ecological integrity of our grassland ecosystems.

British Columbia's arid valleys are the northern limit of distribution for many species that have their centre of distribution in the Great Basin of the western United States. This makes conserving the habitat of these British Columbia populations of plants and animals especially important because their genetic ability to survive at the edge of their range may be critical in allowing species to adapt successfully to climate change. These and other rare species are already endangered; further loss of habitat could mean the complete loss of these species.

Native peoples of British Columbia's interior valleys have long used wetland plants for food, clothing, and medicine. Cattails, which are found in many of the marshes, are a marvellous example of this. The young flower spikes, stems, and leaves, as well as the starchy rhizomes, are all edible. The leaves can be woven to make capes, hats, blankets, or bags, mats for bedding or kneeling on in canoes, or insulation for winter homes. The soft seed fluff can be used for stuffing pillows and mattress and even diapers. Medicinally, the sticky juice inside cattail leaves can be rubbed on the gums to relieve toothaches.

Wetlands store and filter water and help to maintain water quality in their surrounding region. The flow of water in ecological systems is comparable to that of the flow of blood in the human body and wetlands carry out the same function as the kidney. Many urban and rural communities are now mimicking these natural systems by using biofiltration wetlands to remove urban and agricultural contaminants before they enter streams.

Range of southern interior grassland and ponderosa pine forest.

The economic value of the hydrological, water-quality, habitat, and other functions that wetlands provide, has been estimated at more than $22,000 per hectare per year. As green space, wetlands can help increase real estate values in adjacent areas and improve the local economy by drawing tourists into the region. Wetlands also offer opportunities for bird watching, aesthetic enjoyment, and educating our children about the natural environment.

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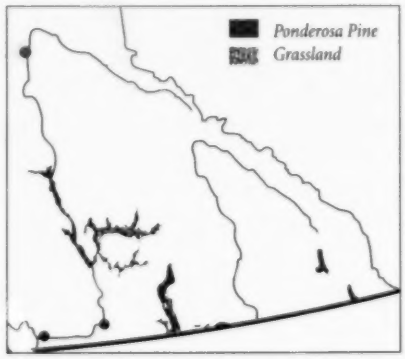
What is the history of British Columbia's arid interior wetlands?

The wetlands of the arid valleys of British Columbia's interior owe much of their unique character to the physical landscape in which they were formed. British Columbia's current landscape is the result of a series of glaciations that occurred over the past two million years. During the most recent period of glaciation, ice deposited the majority of the present-day surficial materials; glacial till deposited directly by the ice; layers of sand, silt and clay deposited in large ice dammed lakes; and sand and gravel deposited by glacial melt water streams.

Deglaciation in British Columbia's interior lasted from 13 000 to 10 000 years ago and occurred largely by the melting of stranded ice. This resulted in the deposition of thick materials in the form of blankets, plains and undulating deposits. Subsequent erosion and further deposition of surficial materials formed terraces, gullies, fans and floodplains.

Today, British Columbia's interior wetlands occupy poorly drained depressions and low lying areas. These were created by ice that melted and left depressions, by runoff from melting ice that carved flat-bottomed meltwater channels, and by stagnant or slow moving meltwater which deposited fine materials in large level areas.

Underlain by thick surficial material, these interior wetlands have a large water storage capacity. This is in contrast to the majority of wetlands in British Columbia, which are underlain by bedrock, or thin material over bedrock, and consequently have limited water storage capacity. This ability to store large quantities of water, in combination with the arid



climate, accentuates the ecological importance of wetlands in the interior valleys, making them unique in the province.

Unfortunately, this characteristic may also spell their demise. Not as effectively cut off from the surrounding landscape as bedrock controlled wetlands, they are vulnerable to all adjacent land use practices.

Many Great Basin plant and animal species migrated northward into southern British Columbia during the post glacial warm period about 8000 years ago. Initially, these species occupied a relatively large area, but a cooler and wetter period, beginning 4000 to 5000 years ago, caused the arid lands of British Columbia and their characteristic wetlands to shrink to their present distribution.

THIS WETLAND, FOUND IN THE CARIBOO GRASSLANDS, ACTS AS AN OASIS IN A PARCHED LAND. *Kristi Iverson photo*

What is their conservation status?

The grasslands of British Columbia are a rare ecosystem type, covering only 0.3 percent of the province, and the wetlands associated with these arid regions occur on only a minute fraction of this. Within British Columbia as a whole, approximately 6 per cent of the total land area is covered by wetlands, but within the arid and semi-arid valleys the total area covered by wetlands is estimated at only 0.5 percent. Given the range and extent of these wetlands alone, they are extremely rare and special in the province. Their endangered status is heightened, however, by the fact that there are impending threats to these wetland ecosystems. Development pressures continue to contribute to the disappearance of wetlands, and many of those that remain may succumb to draining, ditching, pollution, or other threats to their ecological integrity.

The Conservation Data Centre (CDC) of British Columbia tracks plant communities that are Red-listed (endangered or threatened) or Blue-listed (vulnerable). Many of the arid valley wetland plant communities are considered endangered, threatened, or vulnerable. These Red- or Blue-listed wetlands include alkaline meadows and marshes of saltgrass and foxtail barley, baltic rush and silverweed, and woolly sedge and arctic rush, as well as shrub swamps dominated by water birch and red-osier dog-wood or sandbar and peach-leaf willow. In these hot, dry regions, many individual Red- and Blue-listed plant and animal species are also either found in, or depend upon, wetlands. Examples include damselflies such as the Red-listed Vivid Dancer, amphibians such as the Red-listed Tiger Salamander, birds as elegant as the Red-listed American Avocet and as noisy as the Red-listed Yellow-breasted Chat, and plants such as the Blue-listed giant helleborine, one of B.C.'s largest native orchids.

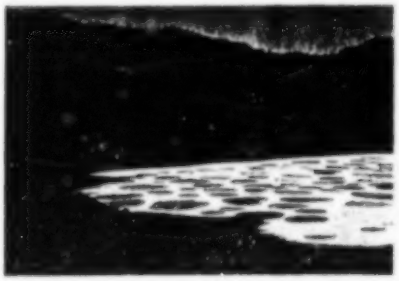
How can we protect endangered wetlands?

In the southern interior, opportunities to fully protect wetland ecosystems in parks or ecological reserves are limited because most of the remaining wetlands occur on private land. As a result, protecting them will depend on private land stewardship, citizen advocacy, and development decisions.

There are many things that individuals, landowners, ranchers, developers, and stewardship groups can do to protect the unique wetlands and the biodiversity of the immensely rich dry regions of the province, including supporting acquisitions of habitat or acquisitions by agencies such as The Nature Trust of BC, The Land Conservancy, Nature Conservancy of Canada or Ducks Unlimited Canada.

Private landowners are increasingly aware of the ecological importance of wetlands. Many are rightfully proud of their land's contribution to wildlife habi- tat within a fragmented landscape. Their stewardship is essential for the maintenance of these ecosystems. For example, finding alternatives to dyking and channelling, and restricting or controlling the use of wetlands by cattle, will make a marked difference in whether or not a wetland remains intact.

Several options are available for landowners interested in protecting important habitats on their property. Conservation covenants are entered into voluntarily by the landowner and provide for the long term protection of species and ecosystems while still allowing specified uses of the property. Covenants are legally binding, permanent agreements that are registered on title, and are transferred with ownership. Many local conservation organizations and land trusts can provide assistance with setting up conservation covenants or other stewardship agreements. Other options include transfer of titles by sale or gift. Ecogifting provides tax credits or incentives to landowners that register a covenant on their property or donate land for conservation.



SPOTTED LAKE, A DISTINCTIVE ALKALINE WETLAND
Syd Cannings photo

THIS THREATENED NATIVE ORCHID CAN BE FOUND IN WETLANDS OF THE DRY INTERIOR VALLEYS. *Hans Roemer photo*

INFILLING OF WETLANDS RESULTS IN THE PERMANENT LOSS OF HABITAT AND BIODIVERSITY. *Steve Cannings photo.*

In addition to being susceptible to destruction by on-site development, wetlands are vulnerable to activities on adjacent land that can disrupt wetland hydrology. When a planned development will affect land adjacent to wetland ecosystems, a season-by-season ecological inventory should be conducted by a registered professional. Consult the CDC database to ensure the development does not affect endangered, threatened or vulnerable species and plant communities. Damage to wetlands can be minimized by establishing buffer zones so as to protect the surrounding vegetation and the places where water flows into and out of the wetland, and keeping the amount of pavement to a minimum (reducing sedimentation from road building, agricultural runoff, and urban storm drainage). Protecting the wetland's vegetation and structure will preserve wildlife habitat, including nesting and breeding sites.

Restricting recreational and pet access to wetlands, particularly during the nesting and breeding season from early March to August, can make a difference to the survival of breeding populations. Horseback riding, mountain biking, all terrain vehicles, and hiking can seriously degrade wetlands, and should be minimized, seasonally restricted or excluded from the area. Controlling the introduction or spread of invasive plant or animal species will also benefit wetland ecosystems. Experts can provide information about the best methods for controlling specific species. Allow natural ecological processes such as beaver activity and flooding to occur.

Individuals can become involved in local or provincial natural history and conservation organizations. Many fragile ecosystems have been saved by people working together. Talk to your neighbours and friends and make the saving of wild places a group or community effort. Keep abreast of proposed developments in your area and tell your local residential developer that maintaining existing wetlands has value to you as a potential property owner. Attend public meetings and voice your opinions about proposed developments. Bring your neighbours. Find out how you can have an influence in what happens in the future. In the end, people like you will help determine if our wetlands disappear or continue to breathe life into British Columbia's dry landscapes for generations to come.

FOR MORE INFORMATION ON RARE SPECIES AND HABITATS, CONTACT:
B.C. Conservation Data Centre, Ministry of Sustainable Resource Management
PO Box 9993, Stn. Prov. Govt., Victoria, British Columbia V8W 9R7
http://srmwww.gov.bc.ca/cdc

For more information on donating ecologically sensitive land, contact:
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Email: ecogifts@ec.gc.ca http://www.cws-scf.ec.gc.ca/ecogifts/index_e.cfm
or: Green Legacies, a Donor's Guide for B.C.
http://www.stewardshipcentre.bc.ca/green_legacies_web/index.asp

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